

## APPARATUS FOR WASHING CLOTHING

### BACKGROUND

[0001] The present invention relates generally to the field of clothes washing apparatus and more specifically to the field of agitators for vertical washing machines.

[0002] In a vertical washing machine, clothing to be washed is placed in the machine's washer basket. A vaned agitator reciprocates about a vertical axis providing a pumping action to move the clothing outward from the center of the basket and vertically upward along the basket wall. With a single action agitator, gravity moves the clothing downward toward the basket bottom thus completing a circular motion known as "turnover." With a dual action agitator, an auger at the basket center enhances turnover by ratcheting in one direction and actively pulling the clothing downward.

[0003] The torque on the agitator shaft depends on the efficiency of the agitator as a pump to move the clothing and wash solution mixture. This efficiency in turn depends on the vane shape along with the stroke and frequency of the agitator reciprocating motion. A more efficient vane design would reduce the torque on the agitator shaft and provide an opportunity for cost reduction in the washing machine drive system. Also, a more efficient vane design with lower agitator torques would use less work to move the clothing and would provide an opportunity to reduce wear on the clothing during agitation cycles.

### SUMMARY

[0004] The opportunities described above are addressed, in one embodiment of the present invention, by an apparatus for washing clothing, the apparatus comprising: an agitator hub; and an agitator vane mechanically coupled to the agitator hub at a proximal edge of the agitator vane, the agitator vane having a vane height not monotonically decreasing from the proximal edge to a distal edge.

## DRAWINGS

[0005] These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0006] The Figure illustrates a perspective drawing in accordance with one embodiment of the present invention.

## DETAILED DESCRIPTION

[0007] In accordance with one embodiment of the present invention, the Figure illustrates a perspective drawing of an apparatus 100 for washing clothing. Apparatus 100 comprises an agitator hub 110 and an agitator vane 120. Agitator vane 120 is mechanically coupled to agitator hub 110 at a proximal edge 130 of agitator vane 120. As used herein, “mechanically coupled” refers to any coupling method capable of supporting the necessary forces. Examples of such methods include, without limitation, welding, brazing, soldering, riveting, and attaching with fasteners, as well as producing agitator hub 110 integral with agitator vane 120 as, for example, by casting or molding.

[0008] As shown in the Figure, agitator vane 120 has a vane height 125 not monotonically decreasing from proximal edge 130 to a distal edge 140. Vane height 125 is defined as a vertical distance from any convenient horizontal plane. Having vane height 125 not monotonically decreasing produces a narrowing of agitator vane 120. Such narrowing serves to increase vane compliance and thereby enhance vane efficiency.

[0009] In accordance with a more specific embodiment in accordance with the embodiment of the Figure, agitator vane 120 has a tangential linear compliance at distal edge 140 greater than about 2 centimeters per kilogram force. A horizontal force applied to distal edge 140 in a direction orthogonal to vane surface 160 produces

a deflection along the force direction. As used herein, "tangential linear compliance" refers to a quotient obtained by dividing the deflection by the force.

[0010] In a still more specific embodiment in accordance with the embodiment of the Figure, agitator vane 120 has a tangential linear compliance at distal edge 140 in a range from about 2.3 to about 2.9 centimeters per kilogram force.

[0011] In another embodiment in accordance with the embodiment of the Figure, apparatus 100 further comprises an auger 150. Auger 150 is mechanically coupled to agitator hub 110 and provides a downward pull on clothing during agitation.

[0012] While only certain features of the invention have been illustrated and described herein, many modifications and changes will occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.